ing a sample, and optionally one or more solution phase assay reagents, into an detection chamber (preferably a flow cell) that comprises one or more assay domains (preferably a plurality of assay domains) comprising immobilized assay reagents that bind (with at least some degree of selectivity) with analytes of interest. Preferably, there are at least two assay domains that comprise binding immobilized binding reagents that differ in their selectivity for analytes. Preferably, there is a patterned array of immobilized binding reagents. The detection chamber preferably comprises a plurality of electrodes including one or more assay working electrodes having assay domains. In such a case, electrical energy is applied to the electrodes (e.g., in a pair wise fashion as described above) to induce an assay dependent signal (e.g., an electrochemical signal such as a current or potential or, preferably, an electrode induced luminescence signal, most preferably an electrochemiluminescence signal) at the electrodes which is dependent on the amounts of the analytes of interest present in the sample. The assay dependent signal is measured to determine the amounts of the analytes of interest. The assays may comprise the step of washing the electrodes with a wash solution or they may be carried out in a non-wash format. In washed electrochemiluminescence assays, the assay preferably comprises the steps of washing the electrodes with a solution comprising an electrochemiluminescence coreactant (e.g., a tertiary alkyl amine such as tripropylamine or PIPES; for other examples of suitable coreactants see copending U.S. patent application Ser. No. 10/238,437 filed Sep. 10, 2002) and inducing ECL in the presence of the coreactant. In non-washed ECL assays, a coreactant is preferably introduced into the detection chamber with the sample or is present in the detection chamber prior to the introduction of the sample. Advantageously, assay modules comprising a plurality of assay domains, preferably on a plurality of electrodes, may be used to conduct assays for a plurality of analytes of interest.

[0360] In preferred embodiments of the invention, the assay modules (preferably, assay cartridges) of the invention are used to carry out binding assays, most preferably sandwich or competitive binding assays, preferably sandwich or competitive immunoassays. Such assays may, optionally, comprise the step of introducing into the detection chamber labeled binding reagents such as a labeled binding partner of the analyte of interest or a labeled competitor that competes with the analyte of interest for a binding partner of the analyte of interest. Alternatively, these reagents may be stored in dry or wet form in the detection chamber. For more information on the conduct of binding assays, particularly using electrochemiluminescence based detection, see copending U.S. patent application Ser. No. 10/185,274, filed Jun. 28, 2002 and copending U.S. patent application Ser. No. 10/238,391, filed Sep. 10, 2002, these patent applications hereby incorporated by reference.

[0361] The assay modules (preferably, assay cartridges) may be used to carry out panels of assays. Suitable panels include panels of assays for analytes or activities associated with a specific biochemical system, biochemical pathway, tissue, organism, cell type, organelle, disease state, class of receptors, class of enzymes, class of pathogen, environmental sample, food sample, etc. Preferred panels include immunoassay for cytokines and/or their receptors (e.g., one or more of TNF-α, TNF-β, IL-α, IL1-β, IL2, IL4, IL6, IL10, IL12, IFN-γ, etc.), growth factors and/or their receptors (e.g., one or more of EGF, VGF, TGF, VEGF, etc.), second messengers (e.g., cAMP, cGMP, phosphorylated forms of inositol and phosphatidyl inositol, etc.) drugs of abuse, therapeutic drugs, auto-antibodies (e.g., one or more antibodies directed against the Sm, RNP, SS-A, SS-B Jo-1, and Scl-70 antigens), allergen specific antibodies, tumor markers, cardiac markers (e.g., one or more of Troponin T, Troponin I, myoglobin, CKMB, etc.), markers associated with hemostasis (e.g., one or more of Fibrin monomer, D-dimer, thrombin-antithrombin complex, prothrombin fragments 1 & 2, anti-Factor Xa, etc.), markers of acute viral hepatitis infection (e.g., one or more of IgM antibody to hepatitis A virus, IgM antibody to hepatitis B core antigen, hepatitis B surface antigen, antibody to hepatitis C virus, etc.), markers of Alzheimers Disease (β-amyloid, tau-protein, etc.), markers of osteoporosis (e.g., one or more of cross-linked N or C-telopeptides, total deoxypyridinoline, free deoxypyridinoline, osteocalcin, alkaline phosphatase, C-terminal propeptide of type I collagen, bone-specific alkaline phosphatase, etc.), markers of fertility (e.g., one or more of Estradiol, progesterone, follicle stimulating hormone (FSH), luetenizing hormone (LH), prolactin, β-hCG, testosterone, etc.), markers of congestive heart failure (e.g., one or more of β-natriuretic protein (BNP), a-natriuretic protein (ANP), endothelin, aldosterone, etc.), markers of thyroid disorders (e.g., one or more of thyroid stimulating hormone (TSH), Total T3, Free T3, Total T4, Free T4, and reverse T3), and markers of prostrate cancer (e.g., one or more of total PSA, free PSA, complexed PSA, prostatic acid phosphatase, creatine kinase, etc.), pathogens associated with upper respiratory infection (e.g., influenza A, influenza B, Respiratory Syncytial Virus, *Streptococci* species), pathogens found in food and water (e.g., salmonella, listeria, cryptosporidia, campylobacter, *E. Coli* 0157, etc.), sexually transmitted diseases (e.g., HIV, syphilis, herpes, gonorrhea, HPV, etc.), blood borne pathogens and potential bioterrorism agents (e.g., pathogens and toxins in the CDC lists of Select A, B and C agents such as *B. anthracis, Y. pestis*, small pox, *F. tularensis*, ricin, botulinum toxins, staph enterotoxins, etc.). Preferred panels also include nucleic acid arrays for measuring mRNA levels of mRNA coding for cytokines, growth factors, components of the apoptosis pathway, expression of the P450 enzymes, expression of tumor related genes, pathogens (e.g., the pathogens listed above), etc. Preferred panels also include nucleic acid arrays for genotyping individuals (e.g., SNP analysis), pathogens, tumor cells, etc. Preferred panels also include libraries of enzymes and/or enzyme substrates (e.g., substrates and/or enzymes associated with ubiquitination, protease activity, kinase activity, phosphatase activity, nucleic acid processing activity, GTPase activity, guanine nucleotide exchange activity, GTPase activating activity, etc.). Preferred panels also include libraries of receptors or ligands (e.g., panels of G-protein coupled receptors, tyrosine kinase receptors, nuclear hormone receptors, cell adhesion molecules (integrins, VCAM, CD4, CD8), major histocompatibility complex proteins, nicotinic receptors, etc.). Preferred panels also include libraries of cells, cell membranes, membrane fragments, reconstituted membranes, organelles, etc. from different sources (e.g., from different cell types, cell lines, tissues, organisms, activation states, etc.).

[0362] The present invention also includes kits. The kits may include disassembled components necessary to make an assay module of the invention. Alternatively, the kits may comprise, in one or more containers, an assay module of the invention and at least one additional assay reagent necessary to carry out an assay. The one or more assay reagents may